PATENT ABSTRACTS OF JAPAN

(11)Publication number : 10-255827

(43)Date of publication of application : 25.09.1998

(51)Int.Cl. H01M 8/04

(21)Application number : 09-054413

(22)Date of filing : 10.03.1997

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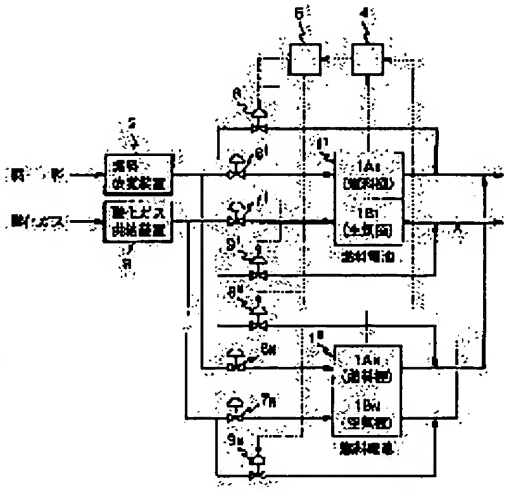
(54) FUEL CELL POWER GENERATION SYSTEM

(57)Abstract:

PROBLEM TO BE SOLVED: To continue the safety operation of a fuel cell power generation system, and lengthen the service life of a fuel cell by providing a bypass control device which inputs an abnormal signal of a fuel cell abnormality detecting device and controls a fuel gas bypass valve and an oxidizing gas bypass valve.

SOLUTION: Abnormality detected by a fuel cell abnormality detecting device 4 is inputted to a bypass control device 5. The bypass control device 5 controls a fuel gas bypass valve 8 so as to secure a passage of fuel gas by cooperating with cutoff operation of a fuel gas flow control valve 6 of a fuel cell on which abnormality is caused, and similarly, an oxidizing gas bypass valve 9 is controlled so as to secure a passage of oxidizing gas by cooperating with a cutoff operation of an oxidizing gas flow control valve 7. The fuel gas



bypass valve 8 is controlled on cutoff by cooperating with reduction in the fuel gas supplied from a fuel reformer 2 according to stopping of power generation of the fuel cell on which abnormality is caused, and similarly, the oxidizing gas bypass valve 9 is also controlled on cutoff by cooperating with reduction in the oxidizing gas supplied from an oxidizing gas supply device 3.

LEGAL STATUS

[Date of request for examination]	10.03.1997
[Date of sending the examiner's decision of rejection]	11.07.2000
[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]	
[Date of final disposal for application]	
[Patent number]	
[Date of registration]	
[Number of appeal against examiner's decision of rejection]	
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CLAIMS

[Claim(s)]
[Claim 1] Two or more fuel cells generated according to the electrochemical reaction of fuel gas and oxidation gas, A fuel gas supply means to supply said fuel gas to this fuel cell, and an oxidation gas supply means to supply said oxidation gas to said fuel cell, In the fuel cell generation-of-electrical-energy system equipped with two or more fuel gas flow rate control means which control the fuel gas flow rate supplied to said fuel cell, and two or more oxidation quantity-of-gas-flow control means which control the oxidation quantity of gas flow supplied to said fuel cell The fuel cell malfunction detection equipment which detects the abnormalities of said fuel cell, and a fuel gas bypass means not to supply the fuel gas controlled by said fuel gas flow rate control means to said fuel cell, but to bypass it, An oxidization gas bypass means not to supply the oxidization gas controlled by said oxidization quantity-of-gas-flow control means to said fuel cell, but to bypass and pass it, The fuel cell generation-of-electrical-energy system characterized by having by-pass control equipment which inputs the abnormality signal detected with said fuel cell malfunction detection equipment, and controls said fuel gas bypass means and said oxidization gas bypass means.
[Claim 2] The fuel cell malfunction detection equipment which detects the abnormalities of said fuel cell in the fuel cell generation-of-electrical-energy system of claim 1, A fuel gas bypass means not to supply the fuel gas controlled by said fuel gas flow rate control means to said fuel cell, but to bypass it, An oxidization gas bypass means not to supply the oxidization gas controlled by said oxidization quantity-of-gas-flow control means to said fuel cell, but to bypass and pass it, A fuel gas cutoff means to intercept supply of fuel gas to said fuel cell, and an oxidation gas cutoff means to intercept supply of oxidation gas to said fuel cell, The fuel cell generation-of-electrical-energy system characterized by having by-pass control equipment which inputs the abnormality signal detected with said fuel cell malfunction detection equipment, and controls said fuel gas bypass means, said oxidization gas bypass means, said fuel gas cutoff means, and said oxidization gas cutoff means.
[Claim 3] Two or more fuel cells generated according to the electrochemical reaction of fuel gas and oxidation gas, A fuel gas supply means to supply said fuel gas to this fuel cell, and an oxidation gas supply means to supply said oxidation gas to said fuel cell, Two or more fuel gas flow rate control means which control the fuel gas flow rate which carries out grouping of said fuel cell, and is supplied to each group, In the fuel cell generation-of-electrical-energy system equipped with two or more oxidation quantity-of-gas-flow control means which control the oxidation quantity of gas flow which carries out grouping of said fuel cell, and is supplied to each group The fuel cell malfunction detection equipment which detects the abnormalities of said fuel cell, and a fuel gas bypass means not to supply the fuel gas controlled by said fuel gas flow rate control means to said fuel cell group, but to bypass it, An oxidization gas bypass means not to supply the oxidization gas controlled by said oxidization quantity-of-gas-flow control means to said fuel cell group, but to bypass and pass it, The fuel cell generation-of-electrical-energy system characterized by having by-pass control equipment which inputs the abnormality signal detected with said fuel cell malfunction detection

equipment, and controls said fuel gas bypass means and said oxidization gas bypass means.
[Claim 4] The fuel cell malfunction detection equipment which detects the abnormalities of said fuel cell in the fuel cell generation-of-electrical-energy system of claim 3, A fuel gas bypass means not to supply the fuel gas controlled by said fuel gas flow rate control means to said fuel cell group, but to bypass it, An oxidization gas bypass means not to supply the oxidization gas controlled by said oxidization quantity-of-gas-flow control means to said fuel cell group, but to bypass and pass it, A fuel gas cutoff means to intercept supply of fuel gas to said fuel cell group, An oxidation gas cutoff means to intercept supply of oxidation gas to said fuel cell group, The fuel cell generation-of-electrical-energy system characterized by having by-pass control equipment which inputs the abnormality signal detected with said fuel cell malfunction detection equipment, and controls said fuel gas bypass means, said oxidization gas bypass means, said fuel gas cutoff means, and said oxidization gas cutoff means.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the fuel cell generation-of-electrical-energy system which put side by side two or more fuel cells especially with respect to a fuel cell generation-of-electrical-energy system.
[0002]
[Description of the Prior Art] Drawing 5 is the block diagram having shown the fuel cell generation-of-electrical-energy system which put side by side two or more fuel cells depended on the conventional technique, and is indicated by JP,61-13506,A. As shown in drawing 5 , the fuel cell generation-of-electrical-energy system is equipped with the fuel cell 1, the fuel gas flow control valve 6 which controls the fuel gas amount of supply to each fuel cell, and the oxidation quantity-of-gas-flow control valve 7 which controls the oxidation gas supply volume to each fuel cell. The fuel gas flow rate and oxidation quantity of gas flow to each fuel cell can be made the same, and operation which made the output homogeneity can be made to perform by accommodation of each control valves 6 and 7.
[0003]
[Problem(s) to be Solved by the Invention] As mentioned above, the conventional fuel cell generation-of-electrical-energy system is presupposing the fuel gas flow rate and the oxidation quantity of gas flow that uniform output operation is performed identically the premise [two or more fuel cell engine performance being uniform].
[0004] However, since two or more fuel cells have individual difference in the initial engine performance, engine-performance change, etc., during steady operation, they may have to intercept the fuel gas and oxidation gas supply to a specific fuel cell, and it may have to carry out shutdown a part. Since each capacity supplied from the fuel reformer which two or more fuel cells share, or an oxidation gas transfer unit at this time is supplied according to the amount of electrochemical reaction of the whole system, as for the surplus gas produced in part by the fuel gas to a fuel cell, and oxidation gas supply cutoff, a fuel gas supply pressure and an oxidation gas supply pressure are raised. That is, the problem to which the gas supply cutoff performed as protected operation of generated fuel cells, such as abnormalities, has bad influences, such as an increment in electrode differential pressure, on a healthy fuel cell through the fuel gas supply header and oxidation gas supply header to share occurs.
[0005] The purpose of this invention is continuing stable operation of a fuel cell generation-of-electrical-energy system, and attaining reinforcement of a fuel cell by not doing damage to other healthy fuel cells, but intercepting the gas supply to the fuel cell concerned, when abnormalities occur in a part of two or more fuel cells under generation of electrical energy.
[0006]
[Means for Solving the Problem] Two or more fuel cells which generate this invention according to

the electrochemical reaction of fuel gas and oxidation gas in order to attain the above-mentioned purpose, The fuel reformer which reforms a fuel and generates fuel gas, and two or more fuel gas flow rate control means which control the fuel gas flow rate distributed to each fuel cell, In the fuel cell generation-of-electrical-energy system equipped with the oxidation gas transfer unit which adjusts oxidation gas including air etc. to predetermined temperature and pressure, and two or more oxidation quantity-of-gas-flow control means which control the oxidation quantity of gas flow which distributes to each fuel cell The fuel cell malfunction detection equipment which detects the abnormalities of said fuel cell, and a fuel gas bypass means not to supply the fuel gas controlled by said fuel gas flow rate control means to said fuel cell, but to bypass and pass it, An oxidization gas bypass means not to supply the oxidization gas controlled by said oxidization quantity-of-gas-flow control means to said fuel cell, but to bypass and pass it, It is characterized by having by-pass control equipment which inputs the abnormality signal detected with said fuel cell malfunction detection equipment, and controls said fuel gas bypass means and said oxidization gas bypass means.

[0007] When two or more fuel cells are generating electricity, from the fuel reformer to share or the oxidation gas transfer unit, required fuel gas and oxidation gas are supplied the neither more nor less by the total fuel cell. For this reason, when are constituted as mentioned above and the need for gas cutoff arises in some fuel cells, the passage of the fuel gas which bypasses the fuel cell concerned, and oxidation gas is secured, and the rise of the fuel gas supply pressure by surplus gas or an oxidation gas supply pressure can be prevented. And the fuel gas flow rate control means and oxidation quantity-of-gas-flow control means of the fuel cell concerned become possible [attaining continuation of stable operation of a fuel cell generation-of-electrical-energy system, and reinforcement of a fuel cell], without producing the increment in electrode differential pressure etc. in other healthy fuel cells by cooperating with the amount reduction of distributed gas of a fuel reformer and an oxidation gas transfer unit, and decreasing and intercepting each bypass flow rate.

[0008]

[Embodiment of the Invention] Below, the example of this invention is explained.

[0009] (Example 1) Drawing 1 shows the outline configuration of the fuel cell generation-of-electrical-energy system by the example 1 of this invention. As shown in drawing 1 R> 1, the fuel cell generation-of-electrical-energy system is equipped with two or more fuel cells 11-1N, the fuel reformer 2, and the oxidation gas transfer unit 3.

[0010] Fuels, such as a hydrocarbon supplied to a fuel cell generation-of-electrical-energy system from the outside, serve as fuel gas of high hydrogen concentration with a steam reforming process etc. by the fuel reformer 2. The fuel reformer 2 generates fundamentally fuel gas required for the electrochemical reaction of the 11-1N of two or more whole fuel cells the neither more nor less, is distributed to the amount of fuel gas required for each fuel cell at the fuel gas flow control valves 61-6N, and is supplied to two or more fuel cells [11-1N] fuel electrode 1A1-1AN. Oxidation gas including the air supplied to a fuel cell generation-of-electrical-energy system from the outside is adjusted to a pressure and temperature predetermined with the oxidation gas transfer unit 3. The oxidation gas transfer unit 3 is 11-1 N of two or more fuel cells. Oxidation gas required for the whole electrochemical reaction is supplied the neither more nor less fundamentally, it is distributed to oxidation capacity required for each fuel cell at the oxidation quantity-of-gas-flow control valves 71-7N, and two or more fuel cells [11-1N] air pole 1B1-1BN is supplied. Two or more fuel cells 11-1N generate direct current power by the fuel gas from the fuel reformer 2, and the oxidation gas from the oxidation gas transfer unit 3.

[0011] The description of this example is having fuel cell malfunction detection equipment 4, the fuel gas bypass valves 81-8N, the oxidization gas bypass valves 91-9N, and by-pass control equipment 5. The abnormalities detected with fuel cell malfunction detection equipment 4 are inputted into by-pass control equipment 5. By-pass control equipment 5 controls the fuel gas bypass

valve 8 to secure the passage of fuel gas in harmony with the cutoff actuation of the fuel gas flow control valve 6 of a fuel cell which carried out the abnormal occurrence, and controls the oxidization gas bypass valve 9 similarly to secure the passage of oxidization gas in harmony with cutoff actuation of the oxidization quantity-of-gas-flow control valve 7. And in harmony with reduction of the fuel gas supplied from the fuel reformer 2, cutoff control of the fuel gas bypass valve 8 is carried out with a generation-of-electrical-energy halt of a fuel cell which carried out the abnormal occurrence, and cutoff control of the oxidization gas bypass valve 9 is similarly carried out in harmony with reduction of the oxidization gas supplied from the oxidization gas transfer unit 3.
[0012] The capacity which the bypass passage of fuel gas and oxidization gas which was due to be supplied to the fuel cell which carried out the abnormal occurrence according to this example is secured, and is supplied from the fuel reformer 2 and the oxidization gas transfer unit 3, Since a difference is not produced to the sum total of the capacity which bypasses the capacity and the unusual fuel cell which are supplied to a healthy fuel cell A fuel gas supply pressure and an oxidation gas supply pressure cannot be changed, but it can continue stable operation of a fuel cell generation-of-electrical-energy system, without having bad influences, such as an increment in electrode differential pressure, on a healthy fuel cell, and can attain reinforcement of a fuel cell.
[0013] (Example 2) Drawing 2 shows the outline configuration of the fuel cell generation-of-electrical-energy system by the example 2 of this invention. The description of this example is the fuel gas latching valves 101-10N and the oxidization gas shut off valves 111-11N. It is that have, the fuel gas bypass valve 8 is connected to the back wash of the fuel gas flow control valve 6, and the oxidization gas bypass valve 9 is connected to the back wash of the oxidization quantity-of-gas-flow control valve 7. By-pass control equipment 5 will control the fuel gas bypass valve 8 to secure the passage of fuel gas in harmony with cutoff actuation of the fuel gas latching valve 10 of the fuel cell concerned, if an abnormality signal is inputted, and it controls the oxidization gas bypass valve 9 similarly to secure the passage of oxidization gas in harmony with cutoff actuation of the oxidization gas shut off valve 11. And in harmony with reduction of the fuel gas supplied from the fuel reformer 2, cutoff control of the fuel gas flow control valve 6 is carried out with a generation-of-electrical-energy halt of a fuel cell which carried out the abnormal occurrence, and cutoff control of the oxidation quantity-of-gas-flow control valve 7 is similarly carried out in harmony with reduction of the oxidation gas supplied from the oxidation gas transfer unit 3. The case of this example also has the same effectiveness as an example 1.
[0014] (Example 3) Drawing 3 shows the outline configuration of the fuel cell generation-of-electrical-energy system by the example 3 of this invention. The description of this example is that grouping of two or more fuel cells in a fuel cell generation-of-electrical-energy system was carried out, and they equip each group unit with the fuel gas flow control valves 61-6M, the oxidization quantity-of-gas-flow control valves 71-7M, the fuel gas bypass valves 81-8M, and the oxidization gas bypass valves 91-9M.
[0015] Actuation is the same as actuation of an example 1. The case of this example also has the same effectiveness as an example 1.
[0016] (Example 4) Drawing 4 shows the outline configuration of the fuel cell generation-of-electrical-energy system by the example 4 of this invention. The description of this example is that grouping of two or more fuel cells in a fuel cell generation-of-electrical-energy system was carried out, and they equip each group unit with the fuel gas flow control valves 61-6M, the oxidization quantity-of-gas-flow control valves 71-7M, the fuel gas bypass valves 81-8M, the oxidization gas bypass valves 91-9M, the fuel gas latching valves 101-10M, and the oxidization gas shut off valves 111-11M. Actuation is the same as actuation of an example 2. The case of this example also has the same effectiveness as an example 1.
[0017]
[Effect of the Invention] As explained above, even if it intercepts the fuel gas and oxidation gas to a

fuel cell which carried out the abnormal occurrence according to this invention Since a difference is not produced to the sum total of the capacity supplied from a fuel reformer or an oxidation gas transfer unit, and the capacity which bypasses the capacity and the unusual fuel cell which are supplied to a healthy fuel cell A fuel gas supply pressure and an oxidation gas supply pressure cannot be changed, but it can continue stable operation of a fuel cell generation-of-electrical-energy system, without having bad influences, such as an increment in electrode differential pressure, on a healthy fuel cell, and can attain reinforcement of a fuel cell.

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TECHNICAL FIELD

[Field of the Invention] This invention relates to the fuel cell generation-of-electrical-energy system which put side by side two or more fuel cells especially with respect to a fuel cell generation-of-electrical-energy system.

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PRIOR ART

[Description of the Prior Art] Drawing 5 is the block diagram having shown the fuel cell generation-of-electrical-energy system which put side by side two or more fuel cells depended on the conventional technique, and is indicated by JP,61-13506,A. As shown in drawing 5 , the fuel cell generation-of-electrical-energy system is equipped with the fuel cell 1, the fuel gas flow control valve 6 which controls the fuel gas amount of supply to each fuel cell, and the oxidation quantity-of-gas-flow control valve 7 which controls the oxidation gas supply volume to each fuel cell. The fuel gas flow rate and oxidation quantity of gas flow to each fuel cell can be made the same, and operation which made the output homogeneity can be made to perform by accommodation of each control valves 6 and 7.

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EFFECT OF THE INVENTION

[Effect of the Invention] As explained above, even if it intercepts the fuel gas and oxidation gas to a fuel cell which carried out the abnormal occurrence according to this invention Since a difference is not produced to the sum total of the capacity supplied from a fuel reformer or an oxidation gas transfer unit, and the capacity which bypasses the capacity and the unusual fuel cell which are supplied to a healthy fuel cell A fuel gas supply pressure and an oxidation gas supply pressure cannot be changed, but it can continue stable operation of a fuel cell generation-of-electrical-energy system, without having bad influences, such as an increment in electrode differential pressure, on a healthy fuel cell, and can attain reinforcement of a fuel cell.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] As mentioned above, the conventional fuel cell generation-of-electrical-energy system is presupposing the fuel gas flow rate and the oxidation quantity of gas flow that uniform output operation is performed identically the premise [two or more fuel cell engine performance being uniform].
[0004] However, since two or more fuel cells have individual difference in the initial engine performance, engine-performance change, etc., during steady operation, they may have to intercept the fuel gas and oxidation gas supply to a specific fuel cell, and it may have to carry out shutdown a part. Since each capacity supplied from the fuel reformer which two or more fuel cells share, or an oxidation gas transfer unit at this time is supplied according to the amount of electrochemical reaction of the whole system, as for the surplus gas produced in part by the fuel gas to a fuel cell, and oxidation gas supply cutoff, a fuel gas supply pressure and an oxidation gas supply pressure are raised. That is, the problem to which the gas supply cutoff performed as protected operation of generated fuel cells, such as abnormalities, has bad influences, such as an increment in electrode differential pressure, on a healthy fuel cell through the fuel gas supply header and oxidation gas supply header to share occurs.
[0005] The purpose of this invention is continuing stable operation of a fuel cell generation-of-electrical-energy system, and attaining reinforcement of a fuel cell by not doing damage to other healthy fuel cells, but intercepting the gas supply to the fuel cell concerned, when abnormalities occur in a part of two or more fuel cells under generation of electrical energy.

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MEANS

[Means for Solving the Problem] Two or more fuel cells which generate this invention according to the electrochemical reaction of fuel gas and oxidation gas in order to attain the above-mentioned purpose, The fuel reformer which reforms a fuel and generates fuel gas, and two or more fuel gas flow rate control means which control the fuel gas flow rate distributed to each fuel cell, In the fuel cell generation-of-electrical-energy system equipped with the oxidation gas transfer unit which adjusts oxidation gas including air etc. to predetermined temperature and pressure, and two or more oxidation quantity-of-gas-flow control means which control the oxidation quantity of gas flow which distributes to each fuel cell The fuel cell malfunction detection equipment which detects the abnormalities of said fuel cell, and a fuel gas bypass means not to supply the fuel gas controlled by said fuel gas flow rate control means to said fuel cell, but to bypass and pass it, An oxidization gas bypass means not to supply the oxidization gas controlled by said oxidization quantity-of-gas-flow control means to said fuel cell, but to bypass and pass it, It is characterized by having by-pass control equipment which inputs the abnormality signal detected with said fuel cell malfunction detection equipment, and controls said fuel gas bypass means and said oxidization gas bypass means.
[0007] When two or more fuel cells are generating electricity, from the fuel reformer to share or the oxidation gas transfer unit, required fuel gas and oxidation gas are supplied the neither more nor less by the total fuel cell. For this reason, when are constituted as mentioned above and the need for gas cutoff arises in some fuel cells, the passage of the fuel gas which bypasses the fuel cell concerned, and oxidation gas is secured, and the rise of the fuel gas supply pressure by surplus gas or an oxidation gas supply pressure can be prevented. And the fuel gas flow rate control means and oxidation quantity-of-gas-flow control means of the fuel cell concerned become possible [attaining continuation of stable operation of a fuel cell generation-of-electrical-energy system, and reinforcement of a fuel cell], without producing the increment in electrode differential pressure etc. in other healthy fuel cells by cooperating with the amount reduction of distributed gas of a fuel reformer and an oxidation gas transfer unit, and decreasing and intercepting each bypass flow rate.
[0008]
[Embodiment of the Invention] Below, the example of this invention is explained.
[0009] (Example 1) Drawing 1 shows the outline configuration of the fuel cell generation-of-electrical-energy system by the example 1 of this invention. As shown in drawing 1 R> 1, the fuel cell generation-of-electrical-energy system is equipped with two or more fuel cells 11-1N, the fuel reformer 2, and the oxidation gas transfer unit 3.
[0010] Fuels, such as a hydrocarbon supplied to a fuel cell generation-of-electrical-energy system from the outside, serve as fuel gas of high hydrogen concentration with a steam reforming process etc. by the fuel reformer 2. The fuel reformer 2 generates fundamentally fuel gas required for the electrochemical reaction of the 11-1N of two or more whole fuel cells the neither more nor less, is distributed to the amount of fuel gas required for each fuel cell at the fuel gas flow control valves 61-

6N, and is supplied to two or more fuel cells [11-1N] fuel electrode 1A1-1AN. Oxidation gas including the air supplied to a fuel cell generation-of-electrical-energy system from the outside is adjusted to a pressure and temperature predetermined with the oxidation gas transfer unit 3. The oxidation gas transfer unit 3 is 11-1 N of two or more fuel cells. Oxidation gas required for the whole electrochemical reaction is supplied the neither more nor less fundamentally, it is distributed to oxidation capacity required for each fuel cell at the oxidation quantity-of-gas-flow control valves 71-7N, and two or more fuel cells [11-1N] air pole 1B1-1BN is supplied. Two or more fuel cells 11-1N generate direct current power by the fuel gas from the fuel reformer 2, and the oxidation gas from the oxidation gas transfer unit 3.

[0011] The description of this example is having fuel cell malfunction detection equipment 4, the fuel gas bypass valves 81-8N, the oxidization gas bypass valves 91-9N, and by-pass control equipment 5. The abnormalities detected with fuel cell malfunction detection equipment 4 are inputted into by-pass control equipment 5. By-pass control equipment 5 controls the fuel gas bypass valve 8 to secure the passage of fuel gas in harmony with the cutoff actuation of the fuel gas flow control valve 6 of a fuel cell which carried out the abnormal occurrence, and controls the oxidization gas bypass valve 9 similarly to secure the passage of oxidization gas in harmony with cutoff actuation of the oxidization quantity-of-gas-flow control valve 7. And in harmony with reduction of the fuel gas supplied from the fuel reformer 2, cutoff control of the fuel gas bypass valve 8 is carried out with a generation-of-electrical-energy halt of a fuel cell which carried out the abnormal occurrence, and cutoff control of the oxidization gas bypass valve 9 is similarly carried out in harmony with reduction of the oxidization gas supplied from the oxidization gas transfer unit 3.

[0012] The capacity which the bypass passage of fuel gas and oxidization gas which was due to be supplied to the fuel cell which carried out the abnormal occurrence according to this example is secured, and is supplied from the fuel reformer 2 and the oxidization gas transfer unit 3, Since a difference is not produced to the sum total of the capacity which bypasses the capacity and the unusual fuel cell which are supplied to a healthy fuel cell A fuel gas supply pressure and an oxidation gas supply pressure cannot be changed, but it can continue stable operation of a fuel cell generation-of-electrical-energy system, without having bad influences, such as an increment in electrode differential pressure, on a healthy fuel cell, and can attain reinforcement of a fuel cell.

[0013] (Example 2) Drawing 2 shows the outline configuration of the fuel cell generation-of-electrical-energy system by the example 2 of this invention. The description of this example is the fuel gas latching valves 101-10N and the oxidization gas shut off valves 111-11N. It is that have, the fuel gas bypass valve 8 is connected to the back wash of the fuel gas flow control valve 6, and the oxidization gas bypass valve 9 is connected to the back wash of the oxidization quantity-of-gas-flow control valve 7. By-pass control equipment 5 will control the fuel gas bypass valve 8 to secure the passage of fuel gas in harmony with cutoff actuation of the fuel gas latching valve 10 of the fuel cell concerned, if an abnormality signal is inputted, and it controls the oxidization gas bypass valve 9 similarly to secure the passage of oxidization gas in harmony with cutoff actuation of the oxidization gas shut off valve 11. And in harmony with reduction of the fuel gas supplied from the fuel reformer 2, cutoff control of the fuel gas flow control valve 6 is carried out with a generation-of-electrical-energy halt of a fuel cell which carried out the abnormal occurrence, and cutoff control of the oxidation quantity-of-gas-flow control valve 7 is similarly carried out in harmony with reduction of the oxidation gas supplied from the oxidation gas transfer unit 3. The case of this example also has the same effectiveness as an example 1.

[0014] (Example 3) Drawing 3 shows the outline configuration of the fuel cell generation-of-electrical-energy system by the example 3 of this invention. The description of this example is that grouping of two or more fuel cells in a fuel cell generation-of-electrical-energy system was carried out, and they equip each group unit with the fuel gas flow control valves 61-6M, the oxidization quantity-of-gas-flow control valves 71-7M, the fuel gas bypass valves 81-8M, and the oxidization

gas bypass valves 91-9M.
[0015] Actuation is the same as actuation of an example 1. The case of this example also has the same effectiveness as an example 1.
[0016] (Example 4) Drawing 4 shows the outline configuration of the fuel cell generation-of-electrical-energy system by the example 4 of this invention. The description of this example is that grouping of two or more fuel cells in a fuel cell generation-of-electrical-energy system was carried out, and they equip each group unit with the fuel gas flow control valves 61-6M, the oxidization quantity-of-gas-flow control valves 71-7M, the fuel gas bypass valves 81-8M, the oxidization gas bypass valves 91-9M, the fuel gas latching valves 101-10M, and the oxidization gas shut off valves 111-11M. Actuation is the same as actuation of an example 2. The case of this example also has the same effectiveness as an example 1.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the outline block diagram of the fuel cell generation-of-electrical-energy system by the example 1 of this invention.
[Drawing 2] It is the outline block diagram of the fuel cell generation-of-electrical-energy system by the example 2 of this invention.
[Drawing 3] It is the outline block diagram of the fuel cell generation-of-electrical-energy system by the example 3 of this invention.
[Drawing 4] It is the outline block diagram of the fuel cell generation-of-electrical-energy system by the example 4 of this invention.
[Drawing 5] It is the outline block diagram of the fuel cell generation-of-electrical-energy system by the conventional technique.
[Description of Notations]
1 [-- A fuel reformer, 3 / -- An oxidization gas transfer unit, 4 / -- Fuel cell malfunction detection equipment, 5 / -- By-pass control equipment, 6 / -- A fuel gas flow control valve, 7 / -- An oxidization quantity-of-gas-flow control valve, 8 / -- A fuel gas bypass valve, 9 / -- An oxidization gas bypass valve, 10 / -- A fuel gas latching valve, 11 / -- Oxidization gas shut off valve.] -- The fuel cell, 1A by which the laminating was carried out -- A fuel electrode, 1B -- An air pole, 2

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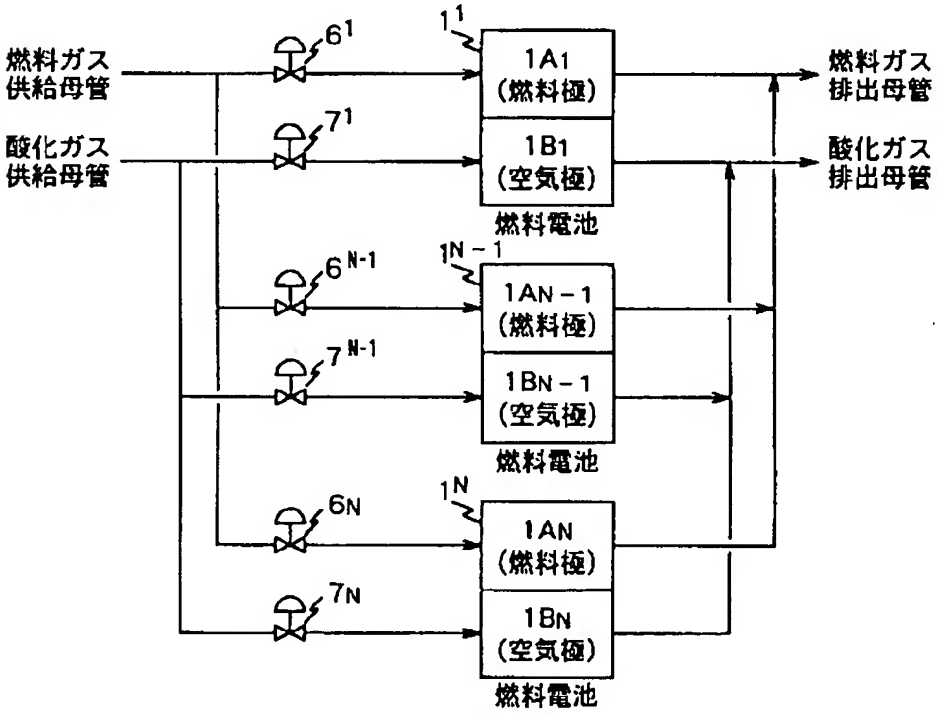
DRAWINGS

[Drawing 5]

図 5



[Drawing 1]

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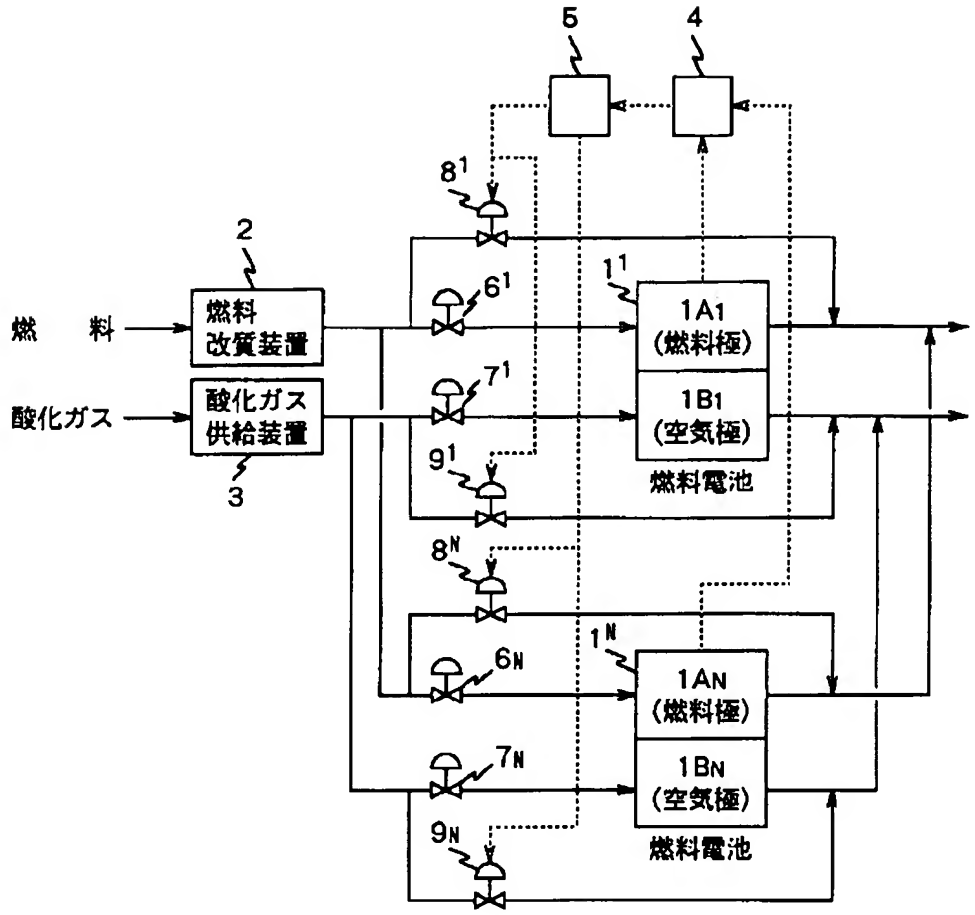
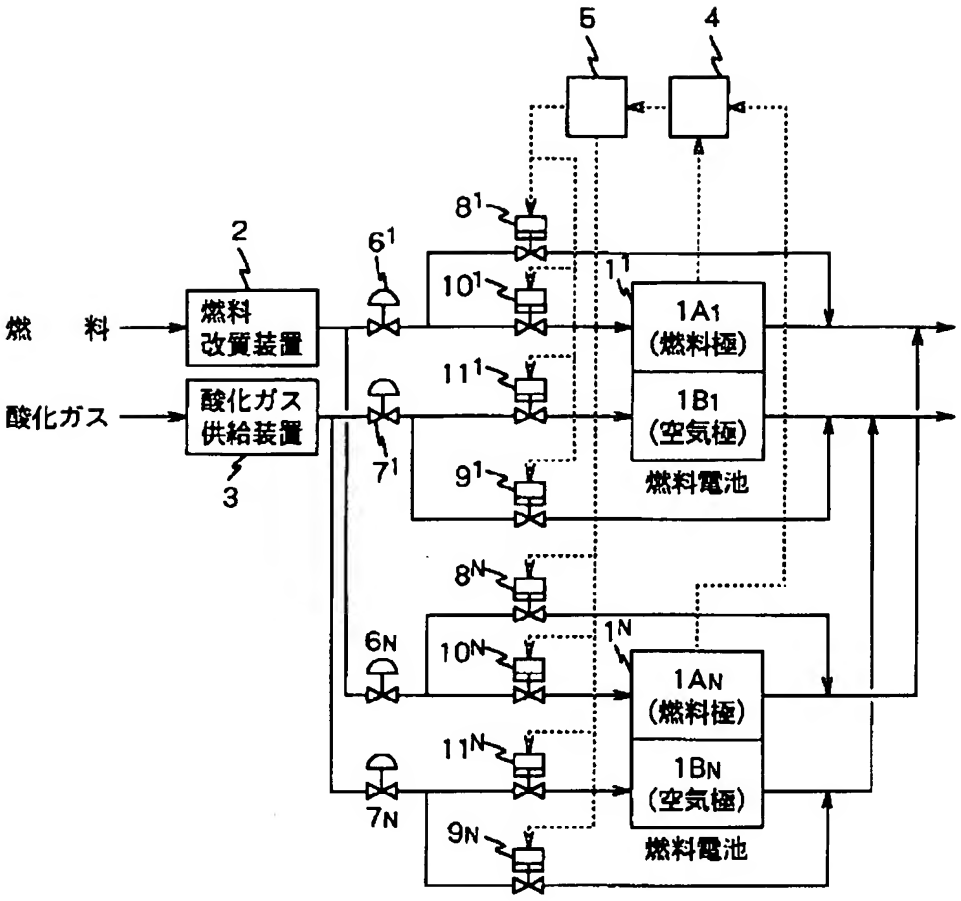

5
4
8^1
2
6^1
1^1
燃　料
燃料
改質装置
1A1
(燃料極)
7^1
酸化ガス
酸化ガス
供給装置
1B1
(空気極)
9^1
燃料電池
3
8^N
1^N
6^N
1AN
(燃料極)
7^N
1BN
(空気極)
9^N
燃料電池

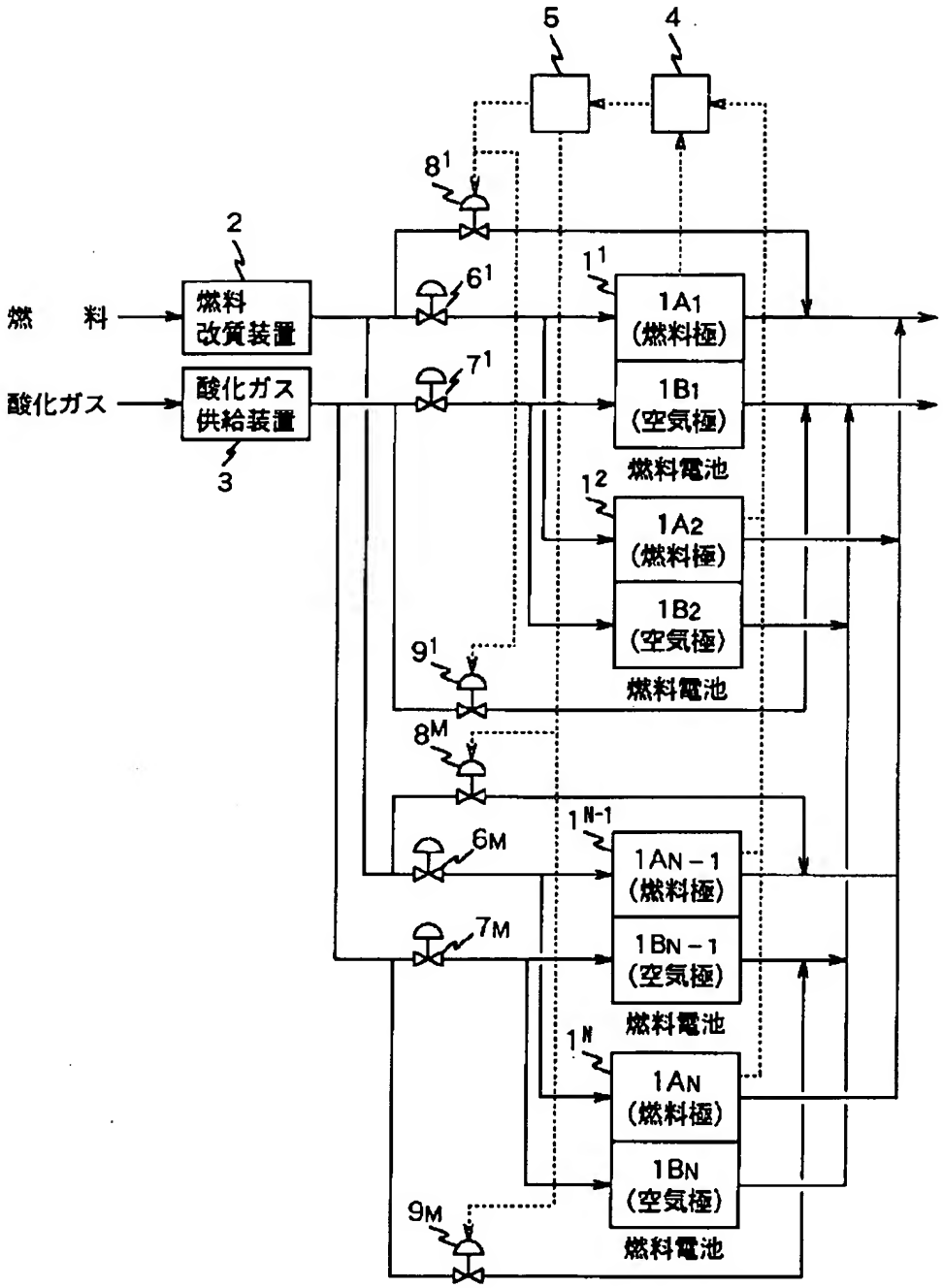
[Drawing 2]

図 2


5
4
2
8^1
6^1
10^1
1
燃　料
燃料
改質装置
$1A_1$
(燃料極)
酸化ガス
酸化ガス
供給装置
11^1
$1B_1$
(空気極)
7^1
9^1
3
燃料電池
8^N
6_N
10^N
1^N
$1A_N$
(燃料極)
11^N
$1B_N$
(空気極)
7_N
9_N
燃料電池

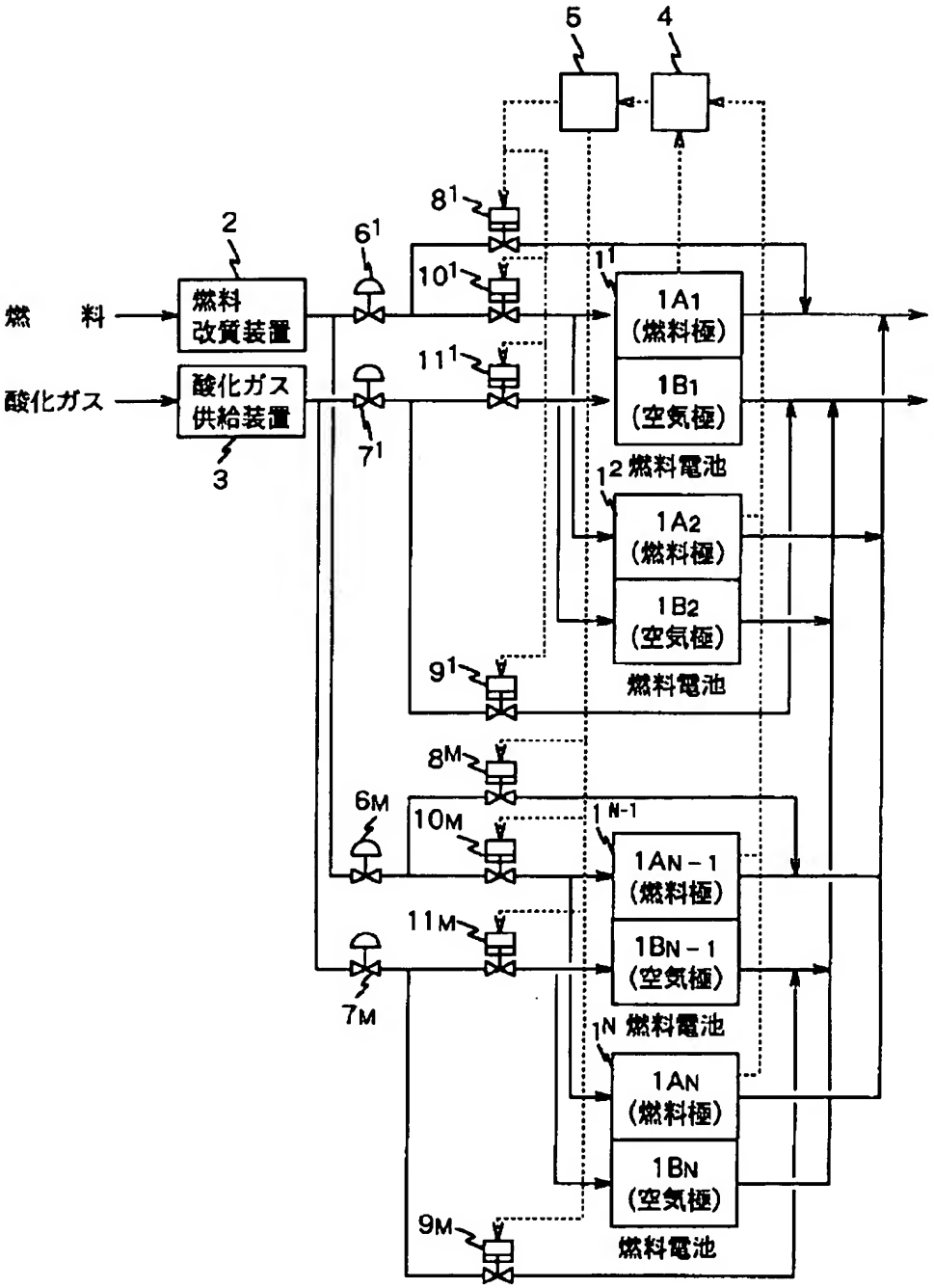
[Drawing 3]

図 3


5
4
8^1
2
6^1
1^1
燃　料
燃料
改質装置
$1A_1$
(燃料極)
酸化ガス
酸化ガス
供給装置
7^1
$1B_1$
(空気極)
3
燃料電池
1^2
$1A_2$
(燃料極)
$1B_2$
(空気極)
9^1
燃料電池
8^M
1^{N-1}
6^M
$1A_N-1$
(燃料極)
7^M
$1B_N-1$
(空気極)
燃料電池
1^N
$1A_N$
(燃料極)
$1B_N$
(空気極)
9^M
燃料電池

[Drawing 4]

図 4



[Translation done.]